WHAT IS CLAIMED IS:

1. An expandable endovascular stent for implanting in a body vessel comprising a single walled tubular body of a biocompatible material having a plurality of annular segments, said annular segments being transverse to the longitudinal axis and having periodic wavelets with a plurality of alternating symmetric peaks and valleys consisting of an arc segment and a straight segment, the said arc segment having a constant or nearly constant curvature, the straight segment being tangentially connected to the arc segment.

2. An expandable endovascular stent according to claim 1 further comprises bridge elements.

3. An expandable endovascular stent according to claim 2 wherein the said bridging elements are connected to the annular segments with the connection points located at or near the stress-neutral points, the said stress-neutral point being located midway or close to midway between the symmetric peaks and valleys of the wavelets of the annular segments.

4. An expandable endovascular stent according to claim 1 wherein the stent longitudinal dimension is substantially the same in the expanded state, the compressed state and any other states between.

5. An expandable endovascular stent according to claim 1 wherein the said annular segment is designed according to the folowing formula I for stress index χ:

$$\chi = \frac{\sigma_{\max}}{Q} = \frac{DEI}{w_s tmR^3 f_0(k)}(1 + \frac{6R(1+k)}{w_s}) \qquad \text{(I)}$$

which is defined as the ratio of the maximum segmental stress (in circumferential direction) in the strut at the peaks and valleys ($\phi = \pi / 2$, cf. FIGURE 3) σ_{max} and expansion ratio Q, where

$$\sigma_{\max} = \frac{F}{w_s t}\left(1 + \frac{6R(1+k)}{w_s}\right),$$

with

$$F = L\,p\,D/2$$

denoting the net segmental force in the strut in the hoop (circumferential) direction of the stent as the result of a radial pressure p in a tubular body vessel of diameter D according to the Laplace equation, where L is the length of bridges, which may become approximately the height of the struts $L = 2(H+R)$ (elements 30 or 31 shown in FIGURE 1), w_s the segment width, t the segment thickness, $k = H/R$ the ratio of the half length of straight segment H and the radius of the arc curvature R, and the expansion ratio Q is given by

$$Q = \frac{4md}{D\pi} = \frac{mFR^3}{DEI} f_0(k)$$

with d denoting the deflection of the half wavelets of annual segment

$$d = \frac{\pi F R^3}{4EI} f_0(k) \ ,$$

m being the number of the wavelets, EI the bending stiffness of the annual segment, and $f_0(k)$ the geometric factor given by

$$f_0(k) = 1 + \frac{8k}{\pi} + 2k^2 + \frac{4k^3}{3\pi} \ .$$

6. An expandable endovascular stent according to claim 1 wherein said stent is expandable by a balloon catheter.

7. An expandable endovascular stent according to claim 1 where in said stent is made of a bio-compatible material capable of elastic and plastic deformation.

8. An expandable endovascular stent according to claim 7 wherein said bio-compatible material is stainless steel.

9. An expandable endovascular stent according to claim 7 wherein said bio-compatible material is gold.

10. An expandable endovascular stent according to claim 7 wherein said bio-compatible material is a nickel titanium alloy

11. An expandable endovascular stent according to claim 10 wherein said nickel titanium alloy is nitinol.

12. An expandable endovascular stent according to claim 1 wherein said stent is coated with a substance that prevents blood coagulation.

13. An expandable endovascular stent according to claim 2 wherein said annular segments are connected by bridge elements to form stents having close cells.

14. An expandable endovascular stent according to claim 2 wherein said annular segments are connected by bridge elements to form stents having open cells.

15. An expandable endovascular stent according to claim 1 wherein said arc segment has an arc angle more than 180 degrees when the stent is in the compressed state.

16. An expandable endovascular stent according to claim 1 wherein the curvatures of the arc segments are varied.